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CHARLES HEARD

UNITED STATES DISTRICT COURT

NORTHERN DISTRICT OF CALIFORNIA

SAN FRANCISCO DIVISION

UNITED STATES OF AMERICA, Plaintiff, v. CHARLES HEARD, Defendant.	NO. 13-cr-00764-WHO **DEFENDANT CHARLES HEARD'S SUPPLEMENTAL MEMORANDUM RE: DNA *DAUBERT* HEARING** Hearing Date: May 16, 2017 Time: 9:00 a.m. Judge: William H. Orrick

INTRODUCTION

Defendant Charles Heard, through counsel, files this memorandum in connection with the DNA *Daubert* hearing scheduled for May 16-17, 2017. The Court previously ordered the hearing on the admissibility of DNA evidence based on the motion filed by Defendant Adrian Gordon, in which Mr. Heard joined. *See Defendant Adrian Gordon's Motion/Memorandum To Exclude DNA Test Results And Request For Daubert Hearing* (Dkt. No. 639) and the related *Exhibits* (Dkt. No. 639-1); *Defendant Charles Heard's Joinder In Codefendant Adrian Gordon's Motion To Exclude*

DNA Test Results And Request For A Daubert Hearing (Dkt. No. 638); *see also* Defendant Esau Ferdinand's *Motion to Exclude Evidence of DNA Testing Performed by Serological Research Institute and Request for Daubert Hearing* and *Memorandum of Points and Authorities* (Dkt. Nos. 647 & 648); *Defendant Charles Heard's Joinder in Codefendants' Motions* (including Mr. Gordon's and Mr. Ferdinand's DNA/*Daubert* motions) (Dkt. No. 683). The DNA *Daubert* hearing will include defendants Heard, Gordon and Ferdinand. The DNA testing at issue for Mr. Heard was conducted by Serological Research Institute (SERI), as was the DNA testing at issue for Mr. Ferdinand.

As stated in the earlier motions, Mr. Heard asserts that: (1) there is no reliable scientific basis for this proposed testimony, and thus the testimony is inadmissible under *Daubert v. Merrell Dow Pharmaceuticals, Inc*., 509 U.S. 579 (1993) and *Kumho Tire Co. v. Carmichael*, 526 U.S. 137 (1999); and (2) the testimony is inadmissible under the amendments to Fed.R.Evid. Rule 702 effective as of Dec. 1, 2000, in that (a) the testimony is not based upon sufficient facts or data, (b) the testimony is not the product of reliable principles and methods, and (c) the government's DNA technicians have not applied the principles and methods reliably to the facts of the case.[1] Mr. Heard also asserts that even if the Court were to find the DNA evidence admissible under *Daubert* and Rule 702, the Court should exclude the evidence under Fed.R.Evid. 403 because it is substantially more prejudicial, confusing, and misleading than probative.

The underlying legal principles and general factual basis regarding Low Copy Number (LCN) or Low Template (LT) DNA testing was set forth in Mr. Gordon's moving papers.[2] In this

[1] While the DNA *Daubert* issues were initiated in this case via pleadings framed as motions to exclude, the Government, as the proponent of the DNA evidence, bears the burden of demonstrating that the DNA testing is reliable and that the results are admissible. *Daubert*, 509 U.S. at 592 n.10; *United States v. Orr*, 692 F.3d 1079, 1091 (10th Cir. 2012); Fed.R.Evid. 702 advisory committee's note to 2000 amendment.

[2] The terms LCN and LT have similar if slightly different meanings to lab analysts. LCN was a term first coined in 2000 to apply to testing in which enhanced methods were used to obtain more sensitive results. As the test kits themselves became more sensitive and labs began to apply stochastic thresholds, the term LT came into use. LT DNA generally does not require the use of enhancements in the testing; rather, it simply refers to samples with very low levels of DNA. In this motion, the term LCN will be used to refer to both LCN and LT testing.

Supplemental Memorandum, Mr. Heard addresses some of the specific issues regarding the testing done in his case, similar to those elucidated in Mr. Gordon's briefing.

SUMMARY OF FACTS PERTINENT TO SERI'S TESTING AND ANALYSIS[3]

The DNA test results from SERI are considered LCN DNA testing for two reasons: 1) The data from the DNA testing of the two samples the government intends to offer fall within the stochastic range of the test; and 2) the lab used two different enhanced methods in conducting the testing, as set forth below. In addition, SERI used a statistical method that is specifically disapproved by the forensic science community.

The evidence at issue are DNA test results from three swabs taken from the left rear doorof the vehicle in which two persons were found murdered on August 14, 2008. These swabs, Item 5-1 (left rear door lock) and Item 6-1(left rear door handle) were obtained and tested by SERI using the Identifiler Plus test kit.[4] Prior to amplifying the sample with Identifiler Plus, the lab quantified the samples. The lab reported that Item 5-1 contained 0.008 ng/ul of total human DNA in a volume of 30 ul, and Item 6-1 contained 0.0028 ng/ul of total human DNA in 30 ul.[5] SERI amplified 0.08 ng of Item 5-1 and 0.25 ng of Item 6-1.[6] The lab used its "ID+29" amplification set up which calls for 29 cycles of amplification.[7] The lab used a 10 second injection and doubled the amount of DNA injected for Item 6-1, and did a 10 second injection of Item 5-1.[8] Both increased injection and doubling of the loaded volume are designed to increase the sensitivity of the test and are listed in the SWGDAM Guidelines for STR Enhanced Detection Methods.[9]

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[3] This summary is presented to provide the Court with a basic framework of the basis for this *Daubert* challenge; it is not intended to be comprehensive.

[4] Bates BG078541 – BG078549. The Bates pages cited in this memorandum are filed under seal in an accompanying filing.

[5] Bates BG084110. The abbreviation "ng" stands for nanogram, which is one billionth of a gram (10^{-9} g.). The abbreviation "ul" stands for microliter, which is one millionth of a liter (10^{-6} g.).

[6] *Id.*

[7] Bates BG084390; SERI Methods Manual, "STR Typing – Genetic Analyzer" at p. 3 of 17 (effective date 01/11/2011).

[8] Bates BG084279 and BG084283.

[9] SWGDAM is the abbreviation for the Scientific Working Group on DNA Analysis Methods.

The lab obtained results indicating that the two samples were complex mixed samples. Item 5-1 was a mixture of at least 3 individuals and Item 6-1 was a mixture of at least 4 individuals.[10] Based on the lab's quantitation records, and an assumption of equal contributors to Items 5-1, approximately 0.026 ng or 26 pg[11] of DNA was amplified for each contributor, and for Item 6-1, with the same assumption, approximately 0.063 ng or 63 pg of DNA was amplified for each contributor.[12] A human cell contains approximately 6 pg of DNA. Thus, for individuals in Item 5-1, three equal portions would consist of approximately 4 or 5 human cells worth of DNA from each contributor. For Item 6-1, four equal portions would consist of approximately 10 human cells worth of DNA from each contributor.

The lab concluded that both "Charles Heard could be a contributor to item 5-1," and "[a]pproximately one person in 12,600 could also be similarly included with respect to Heard. Isiah Turner could be a minor contributor to this DNA.[13] Approximately 1 person in 155 could also be similarly included with respect to Turner."[14] The lab concluded that as to Item 6-1, "Charles Heard could be a contributor to item 6-1," and "[a]pproximately one person in 20 could also be similarly included with respect to Heard."[15] The lab also concluded that Isiah Turner and Reginald Elmore could be minor contributors to Item 6-1, and that "[a]approximately one person in 18 could also be similarly included with respect to Isiah Turner and approximately one person in 2 could also be a minor contributor with respect to Elmore."[16]

The match statistic employed by SERI in drawing these numerical conclusions is the Combined Probability of Inclusion (CPI). This statistic has been used on mixed samples in which

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[10] Bates BG078547.

[11] The abbreviation "pg" stands for picogram, which is one trillionth of a gram (10^{-12} g.)

[12] This calculation was done simply to illustrate the very small amounts of DNA present per individual in this mixture. Given the complexity of the mixture it is not possible to tell exact ratios, and it is not possible to assess the actual number of individuals in the sample.

[13] Bates BG078547. Mr. Turner is one of the persons murdered on Aug. 14, 2008.

[14] *Id.*

[15] *Id.*

[16] *Id.* The Government has indicated that it does not seek to admit into evidence the testing results regarding Mr. Elmore.

a single profile cannot be discerned from the mixture, and it estimates the probability that an individual chosen at random would not be excluded as a potential donor to the evidence sample.

The application of a match statistic in DNA testing is a two-step process. First, the analyst makes a subjective decision regarding whether an individual is included or excluded as a potential donor. Second, the analyst chooses the loci and alleles or types to include in the statistic and calculates a statistic. The scientific literature clearly indicates that the use of the CPI method may not be appropriate under certain circumstance, including where data has dropped out. P. Gill, et al., *DNA Commission of the International Society of Forensic Genetics: Recommendations on the Interpretation of Mixtures*, 160 Forensic Sci. Int. 90, 95, 101 (2006).

> In particular it is problematical to apply the [CPI] method when there are loci which, under the hypothesis being considered of the suspect at hand, appear to have alleles in category C (alleles not seen due to dropout). We have seen many instances in which laboratories do just this, usually by omitting from the RMNE calculation the inconvenient loci. Such a calculation implies, certainly incorrectly, that among the ''random men'' considered for comparison by the calculation only the same loci would be used for inculpation/exculpation as those being considered for the present suspect. It fails to acknowledge that choosing the omitted loci is suspect-centric and therefore prejudicial against the suspect.

Id. at 91.

Additionally, the CPI calculation does not allow for stutter and dropout to be assessed probabilistically. The DNA Commission recommended that the use of the CPI approach be restricted to "unambiguous" profiles (mixture profiles in which major and minor contributors can be clearly distinguished), and described the likelihood ratio statistic as the correct approach. The Commission also indicated that if the DNA crime stain profile contains low levels of DNA, and if drop-out is possible, the CPI method is not the appropriate method to use. *Id.* at 91-92.

In this instance, the use of the CPI is inappropriate. The samples in both Item 5-1 and Item 6-1 are complex mixtures of at least three or four individuals, respectively; the data is low level (as determined by the input quantity of DNA and the amount of data below the stochastic threshold); and the lab must invoke allelic drop-out in order to include Mr. Heard in both samples. Because

these samples are low level and the lab invokes dropout, Items 5-1 and 6-1 are considered to be LCN samples.

Additionally, SERI's CPI calculations are "suspect-centric": they involve a specific, known suspect. In fact, for all of the samples tested by SERI it reports out different CPI calculations for each individual whose reference (or known) sample was tested. This is a clear violation of Guideline 4.2 of the SWGDAM Interpretation Guidelines for Autosomal STR Typing, January 2010, which states, in relevant part: "For calculating the CPE [another name for CPI] or RMP, ***any DNA typing results used for statistical analysis must be derived from evidentiary items and not known samples***." (Emphasis added.) Furthermore, scrutiny of SERI's CPI calculation shows that the lab does not include alleles below the stochastic threshold in the calculation, nor does it consider peaks in the stutter position. While on its face the exclusion of unreliable data from this statistic might be seen as conservative, it actually is not. The impact of not considering these alleles statistically is that it makes the number of individuals who might be included in the mixture appear to be fewer. The end result is that the statistic appears to make an inclusion more rare when, in fact, if that data were considered in the statistic, the resulting CPI would indicate a more common inclusion. As an example, if the CPI that did not use the low level alleles was 1 in 100,000, when those alleles were included the CPI could drop to a much lower number such as 1 in 50,000. The failure to consider this data statistically actually prejudices the defendant and is misleading in its statement of rarity.

The results for both tests fall within the lab's defined stochastic range by peak height. In this case, in order to include Mr. Heard as a contributor to either Item 5-1 or Item 6-1, the lab must invoke the phenomenon of allelic dropout at at least one locus for Item 5-1 and at least two loci for Item 6-1. In addition, as demonstrated by the statistical analysis of both samples, the lab has invoked a defendant-centered statistic which ignores exculpatory information and is specifically disapproved by SWGDAM.

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SERI'S DNA TESTING AND ANALYSIS IS INADMISSIBLE

In its role as the gatekeeper under Fed.R.Evid. 702, the Court must "ensure that evidence presented by expert witnesses is *relevant, reliable, and helpful to the jury's evaluation* of such evidence." *Daubert*, 509 U.S. at 589, 597 (emphasis added). While *Daubert* set forth a non-exclusive list of factors for the Court to consider, those factors are "meant to be helpful, not definitive, and the trial court has discretion to decide how to test an expert's reliability as well as whether the testimony is reliable, based on the particular circumstances of the particular case." *City of Pomona v. SQM North America Corp*., 750 F.3d 1036 (9th Cir. 2014) (quoting *Primiano v. Cook*, 598 F.3d 558, 564 (9th Cir. 2010) (citations and quotation marks omitted)).

This gatekeeping function "requires the judge to assess the reasoning and methodology underlying the expert's opinion, and determine whether it is both scientifically valid and applicable to a particular set of facts." *Dodge v. Cotter Corp*., 328 F.3d 1212, 1221 (10th Cir. 2003). The Supreme Court has made clear that "where [expert] testimony's factual basis, data, principles, methods, or their application are called sufficiently into question . . . the trial judge must determine whether the testimony has 'a reliable basis in the knowledge and experience of [the relevant] discipline.'" *Kumho Tire Co.*, 526 U.S. at 149 (quoting *Daubert*, 509 U.S. at 592).

Generally, the district court should focus on an expert's methodology rather than the conclusions he/she generates. *Daubert*, 509 U.S. at 595. However, an expert's conclusions are not immune from scrutiny: "A court may conclude that there is simply too great an analytical gap between the data and the opinion proffered." *General Elec. Co. v. Joiner*, 522 U.S. 136, 146 (1997). "[N]othing in either *Daubert* or the Federal Rules of Evidence requires a district court to admit opinion evidence which is connected to existing data only by the *ipse dixit* of the expert." *Dodge*, 328 F.3d at 1222.

While a number of cases have addressed the specific question of LCN DNA testing, Mr. Heard urges this Court to adopt the rationale in *United States v. McCluskey*, 954 F.Supp.2d 1224 (D.N.M. 2013). In *McCluskey*, the Court was presented with extensive briefing on many issues related to DNA testing and extensive testimony on the issues involved in LCN DNA testing. As

to one sample tested, the Court concluded that under *Daubert*, the tests results were unreliable. The *McCluskey* Court's analysis differed from other cases[17] in that the focus for the Court "[was] not to establish a definition of 'LCN testing,' but to determine whether the Government's DNA results in this case are reliable and admissible," and noted that the laboratory's own protocol "declared [the sample in question] to contain too small a quantity to yield the ***normally reliable*** DNA profile obtained through PCR/STR testing; Item 1B23B, at 215 pg, [as that sample] is below the Lab's 'stochastic threshold' and therefore 'in the potential danger zone of unreliable results.'" *Id.* at 1278 (emphasis added). The Court expressly recognized that other labs may have differing protocols and obtain reliable results with lower quantities of DNA than the lab in *McCluskey*, and emphasized the issue in the case:

> But what is important is that the NMDPS Lab has empirically determined that 250 pg is its own stochastic threshold; this means that the NMDPS Lab recognizes that, applying its own protocols and using its own instrumentation, ***it expects to see stochastic effects that may render the results unreliable*** when a sample under 250 pg is tested. The question before the Court is whether the Government has carried its burden of demonstrating, by a preponderance of the evidence, that the LCN testing by the NMDPS Lab in this case is nevertheless reliable.

Id. at 1279 (emphasis added).

The *McCluskey* Court rejected the Government's argument that the fact that other labs performed similar testing made the evidence in the case admissible, and focused its analysis on whether the testing in *this* case was reliable.[18] *Id.* In determining the reliability of the test results, the Court consider the presence of peak height imbalance, the fact that increased injection time made the sample ineligible for upload to CODIS, the fact that no replicate testing was done,

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[17] The different approaches and cases are discussed in Mr. Gordon's moving papers. *See Defendant Adrian Gordon's Memorandum* (Dkt. No. 639) at 18:21-22:16.

[18] The *McCluskey* Court also rejected the argument that the holding in *People v. Megnath*, 27 Misc.3d 405, 898 N.Y.S.2d 408 (N.Y.Sup.Ct. 2010) was persuasive because the lab at issue used different procedures and interpretive methods, that there was extensive validation and received certification of its methods, that the *Megnath* held extensive hearings and determined the credibility of that testimony, that the *Megnath* court "made the questionable findings that the *Frye* test only applies to novel scientific evidence and that LCN testing was 'not a novel scientific technique' (despite change in procedure and interpretive methods)" and that the Court didn't account for increased stochastic effects." *McCluskey*, 954 F.Supp.2d at 1279-80.

and finally, that the analyst "did not present a good explanation, or scientific basis, for her opinion that the profile on 1B23B was reliable despite the clear stochastic effects of dropout at four or five loci." *Id.* at 1283-84. The *McCluskey* Court concluded that the Government had not met the standard for admissibility of the testing under *Daubert* and Rule 702 and had "not carried its burden of demonstrating, by a preponderance of the evidence, that LCN testing done by the NMDPS Lab is reliable and admissible under *Daubert* and Rule 702." *Id*. at 1287-88.

CONCLUSION

In this case, the DNA evidence proffered by the Government should be excluded under *Daubert* and Fed.R.Evid. 702 because the methodology used by SERI produces unreliable data and the conclusion of inclusion by SERI in based on the unreliable data obtained by the lab, thereby making that conclusion unreliable. Furthermore, SERI applied a statistical analysis of the data that is specifically disapproved by the forensic community. Finally, even if the Court were to find the DNA evidence admissible under *Daubert* and Rule 702, the Court should exclude the evidence under Fed.R.Evid. 403 because it is substantially more prejudicial, confusing, and misleading than probative.

Dated: May 10, 2017

Respectfully submitted,

/S/
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